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FINANCING NON-FARM ENTERPRISES: USE OF SUB-SECTOR ANALYSIS IN THE GAMBIA

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Abstract

The focus of this study is the financing of non-farm manufacturing enterprises in low income countries. The research utilized sub-sector analysis to examine how linkages among firms, especially for input purchase and output sales, simultaneously determine the financial structure of the firm. The study revealed important differences in the sources of financing among four manufacturing sub-sectors in a sample of 153 micro and small scale enterprises in The Gambia. Implications of the study suggest that if formal intervention schemes are necessary, then providing support through economic subs-sectors may be a most efficient method to reach small enterprises.

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I. Introduction

The design of microenteprise programs continues to be among the priorities of many donors and policy makers concered with securing financial and non-financial services to microentrepreneurs in low income countries. Despite the numerous projects and policies initiated to assist micro and small scale enterprises over the past decade, there is a lack of understanding about the entrepreneur's effective demand for alternative financial services under the circumstances found in many developing countries. Most of the literature that describes the sources of finance for micro, small and medium scale enterprises in low income countries across various sub-sectors is based on a descriptive rather than a diagnostic framework (e.g. Cortes, Berry and Ishaq, 1987; Levy, 1993; McLeod, 1991; Kilby, Liedholm and Meyer, 1984).

Typically, analysts divide the supply of working capital for firms into internal and external sources when describing how micro and small scale entrepreneurs finance their operations, such as in a study of the small scale enterprise sector in Sierra Leone (Kilby, Liedholm and Meyer, 1984). The first source of internal finance is proposed to include personal savings, gifts and informal loans from friends and family, while retained earnings, the second source, was reported as a primary source of funds that firms used for expansion. The external sources of finance identified for short-term credit include customers, suppliers, commercial banks and the curb market. The suggested rank order of importance is, first, customer advance payments, second accounts payable to suppliers, third, loans from commercial banks and, last, are interest bearing informal loans such as those provided by moneylenders. The suggested

reasons for this rank order include cost and information advantages when choosing internal versus external sources.

Descriptive studies often report on field surveys of various sub-sectors in developing countries. The frequent identification of finance as the primary obstacle for developing small scale enterprises is based on fairly weak methodology when the source of data used is based on the entrepreneurs' own subjective responses (e.g. Levy, 1993). When asked about their access to formal finance, entrepreneurs typically respond by arguing that they have a need for credit at reasonable prices. A critical problem in the assessment of the small enterprise sector studies is that they consider formal financial contracts that entrepreneurs use as being exogenously predetermined, and not a function of the overall mix of financial services entrepreneurs use and the particular sub-sectors within which they operate.

An entrepreneur's use of alternative financial services is determined by a number of factors. These include characteristics of the enterprise, attributes of the entrepreneur, rates of return on deposits, interest rates on loans, transaction costs of using alternative sources of financing, and the respective shares of these financial assets and liabilities in total expenditures over the production period (Baydas, 1993). The characteristics of the enterprise and the nature of the demand for and supply of alternative financial services are affected by the sub-sector within which the entrepreneur operates. In addition, the nature of the input and output linkages found among the various economic agents--producers, traders and consumers--in different sub-sectors affects the financial contracts that are available to an entrepreneur. The study of the entrepreneur's use of alternative financial services, therefore, should consider sub-sector differences.

Sub-sector research focuses primarily on the study of vertical linkages and contracts in the distribution or production of goods among the different economic agents (Boomgard et al., 1992). The study of vertical linkages, network coordination and competition in the market place among producers and distributors of a particular product is at the core of the sub-sector research. This method of analysis has shaped many conceptual and empirical studies in both developed and developing countries (Barry, Sonka and Lajili, 1992; Jaffee, 1992; Liedholm and Mead, 1987; Nagarajan and Meyer, 1993; Shaffer, 1973; Sporleder, 1992).

Sub-sector analysis has provided the foundation for many studies of the determinants of marketing linkages among agents from producers to consumers. Asset specificity and uncertainty are believed to have a direct impact on the marketing mechanisms observed across various sub-sectors[1] (Jaffee, 1992). On the one hand, a high degree of asset specificity and uncertainty lead to vertically integrated marketing contracts. On the other hand, low asset specificity and uncertainty lead to spot market transactions where firms specialize generally in one stage of commodity marketing in open markets.

Financial and informational flows, in addition to asset specificity and production uncertainty, are believed to play an important role in shaping the marketing mechanisms found in a given sub-sector (Nagarajan and Meyer, 1993). These determinants are especially important when considering a developing capital market framework. Formal capital markets in developing countries are often rudimentary and offer a limited degree of access to financial services. In such environments, therefore, it is important to consider how the role of financial and informational flows for a given sub-sector explain the market structure and the operations of the eco-

nomic agents in that sub-sector. Thus, sub-sector analysis helps to identify the constraints that affect the different economic units and the appropriate means for policy intervention in a market.

Two important strands of research have utilized the sub-sector analysis in empirical studies focusing on private sector development in developing countries. One set of literature has analyzed the flow of commodities in a particular sub-sector by examining the various channels through which products pass as they flow from the origin to the final end users (e.g. Davies, 1988; Grant, Downing and Haggblade, 1990; Haggblade and Gamser, 1991; Haggblade and Ritchie, 1992). These studies typically present a sub-sector map which is used to analyze the role of the various economic agents in the sub-sector, the terms and conditions of their contracts, and the linkages in their transactions. By describing the functions of the participants and their contracts in a given sub-sector, this type of analysis identifies the problems and potentials of the sub-sector under study and assesses the degree of market integration and coordination.

Another set of literature has identified various sub-sectors in an economy and examined the economic efficiencies of small scale industries (e.g. Liedholm and Parker, 1989; Liedholm and Mead, 1987). These studies have focused on documenting the magnitude of the enterprise sub-sectors in developing countries and analyzed the potential for promoting them. The analysis of the operations of micro and small scale enterprises in most of these studies relies on measures of output and changes in employment at different stages of the firm life cycle. Both approaches, the sub-sector map studies and the small enterprise sub-sector studies, recognize the importance of the sub-sector in explaining the prevailing market contracts and efficiencies; however, most studies, implicitly or explicitly, treat finance as an exogenous factor rather than endogenous in their analysis of a sub-sector and its performance.

This study analyzes the differences found across sub-sectors in the sources of financing used by non-farm manufacturing enterprises in low income countries. An examination of the entrepreneur's choice among various sources of financing will shed light on how financial contracts influence firm behavior across sub-sectors. This study utilizes sub-sector analysis to demonstrate how input purchase and output sale transactions simultaneously determine the financial structure of the firm. The study presents a model which addresses the sources of financing of micro, small and medium scale manufacturing enterprises in developing economies and presents empirical implications based on a study of four sub-sectors in The Gambia.

The Gambia is an interesting country in which to conduct this research. Its Economic Recovery Program (ERP), initiated in 1985, has been viewed as one of the most successful structural adjustment programs in Sub-Saharan Africa (Radelet, 1990). The policy reform objectives have included encouraging private sector development. However, inspite of interest rate liberalization, reduction of inflation and deregulation of input and output markets, there are serious problems with the financial sector in The Gambia. The formal financial institutions play a minimal role in the provision of financial services, and particularly credit, to the trade sector (Pollard et al., 1992). Rather than mobilizing savings and intermediating between deficit and surplus units, these institutions invest a large share of their liabilities in secure government t-bills. Therefore, given that there is little domestic credit flowing to the private sector, it is important to analyze how micro, small and medium scale manufacturing enterprises manage to finance their operations.

The following section presents the theoretical framework used to analyze differences among the sub-sectors in the financing of non-farm enterprises and an empirical model to test

these relationships. Section three discusses the enterprise survey conducted in The Gambia and the data used in the study. Section four reviews the econometric methods and the results of the model. Finally, the last section presents the summary and conclusions.

II. The Theoretical Framework

Sub-sector analysis reveals important insights into vertical linkages, network coordination and competition in the market place, all of which influence the sources of finance used by entrepreneurs. The financing of enterprises can be modeled by assuming a one-period world where entrepreneurs possess a certain amount of wealth to be allocated among different assets. The analysis considers an entrepreneur who knows with certainty production outcomes and all other variables in the model. The entrepreneur operates a manufacturing business where output is produced using a stock of physical capital (K) and a flow of variable inputs. Financing the vector of variable inputs used in production makes up the operating costs which add up to total expenditures (T) over the production period. The characteristics of the particular manufacturing sub-sector have a direct impact on the nature of the physical capital and variable inputs used in production. The sub-sector effect is captured by dummy variables representing the sub-sectors included in the study. Moreover, entrepreneurial or managerial abilities (A) are considered as an indirect input in the production function. Proxy variables, such as the characteristics of the entrepreneur and the enterprise capture the effects of entrepreneurial abilities. The price of output (P) is exogenous and the firm's revenue function is specified as:

$$Y = Y(K, T, A, P). \tag{1}$$

The entrepreneur augments initial wealth, or equity, (W) by drawing on external sources of financing at the beginning of the period which amount to:

$[(1-\delta)B] \qquad 0 < \delta < 1$

where (B) is total borrowing by the end of the production period and δ is the proportion of total borrowing which is used over the production period. Over the production period, the entrepreneur draws on (δB) to finance operating costs (T) which amount by the end of the production period to total borrowing (B). The different sources of external finance are non-commercial informal loans (IL) provided by fellow entrepreneurs, friends and relatives; trade finance from suppliers and customers (TL); and formal loans (FL) from commercial banks and other non-bank institutions such as special microenterprise programs. The part of these liabilities (δB) is drawn upon during the production period at a continuous and constant rate to finance the operating costs (T). More specifically,

$$\delta B = \delta_1 IL + \delta_2 TL + \delta_3 FL$$

where the parameters δ_i, i=1,2,3 are associated with IL, TL and FL, respectively, $0 < \delta_i < 1$, and represent the proportion of each liability that is used to fund the operating costs.

The entrepreneur allocates the resources available to the firm [W + (1-δ)B] among financial assets (FA) and physical assets (K). The various forms of financial assets are: cash holdings (C); informal savings with moneykeepers and rotating savings and credit associations (IH); and formal deposits with commercial banks (D). Over the production period, the entrepreneur draws upon the alternative financial assets and liabilities to finance the cost of inputs. The returns (r), interest rates (i) and transaction costs (t) associated with these assets and liabilities are respectively: (r_i), (i_j) and ($t_{i,j}$), where i= C, IH, D and j= IL, TL, FL. In order

for the firm to fund the rest of its operating costs (T), a part of these assets (αFA) is drawn upon at a continuous and constant rate. More specifically,

$$\alpha FA = \alpha_1 C + \alpha_2 IH + \alpha_3 D$$

where the parameter α_i, i=1,2,3 is associated with C, IH and D, respectively, $0 < \alpha_i < 1$, and represents the proportion of each asset that is used to fund the operating costs.

The firm's balance sheet constraint at the beginning of the period may be expressed as:

$$K + FA = W + (1-\delta)B \tag{2}$$

and the flow of operating costs during the production period may be expressed as:

$$T = \alpha_1 C + \alpha_2 IH + \alpha_3 D + \delta_1 IL + \delta_2 TL + \delta_3 FL \tag{3}$$

The returns on the financial assets and the interest rate cost of the liabilities may be expressed following the inventory theory.[2] Since the fraction of the production period during which cash is used is ($\alpha_1 C/T$), and the average cash holding during this fraction of the production period is ($\alpha_1 C/2$),[3] the total yield on cash holdings is thus:

$$r_C C - r_C[(\alpha_1 C/T)(\alpha_1 C/2)]$$

By analogy, the total returns on financial holdings may be expressed as:

$$r(FA) = r_C C - r_C(\alpha_1 C/T)(\alpha_1 C/2) + r_{IH} IH - r_{IH}(\alpha_2 IH/T)(\alpha_2 IH/2)$$

$$+ r_D D - r_D(\alpha_3 D/T)(\alpha_3 D/2) \tag{4}$$

Similarly, the costs associated with the liabilities drawn upon during the production period may be expressed in a way analogous to inventory theory. Since the fraction of the production period during which informal loans are used is ($\delta_1 IL/T$), and the average informal debt during this fraction of the production period is ($\delta_1 IL/2$), the total cost of informal loans is thus:

$$i_{IL}(1-\delta_1)IL + i_{IL}[(\delta_1 IL/T)(\delta_1 IL/2)]$$

By the same analogy the total interest rate costs of the liabilities may be expressed as:

$$i(B) = i_{IL}(1-\delta_1)IL + i_{IL}(\delta_1 IL/T)(\delta_1 IL/2) + i_{TL}(1-\delta_2)TL + i_{TL}(\delta_2 TL/T)(\delta_2 TL/2)$$
$$+ i_{FL}(1-\delta_3)FL + i_{FL}(\delta_3 FL/T)(\delta_3 FL/2) \quad (5)$$

Assuming no depreciation of physical assets during the production period, the firm's income statement would yield retained earnings (RE) as the total revenue from production and financial assets net of expenditures on operating costs, interest costs on liabilities and transaction costs associated with financial assets and liabilities t(FA, B). This may be expressed as:

$$RE = Y(K,T,A,P) + r(FA) - T - i(B) - t(FA,B) \quad (6)$$

Table 1 presents a summary of the abbreviated variable names and their definitions.

Following the standard microeconomic theory of the firm, the problem becomes one of maximization of retained earnings in the objective function with respect to the decision variables (K, T, C, IH, D, IL, TL, FL) subject to the balance sheet constraint (2) and the expenditure flow identity (3). This may be written as:

$$\text{MAX} \qquad RE = Y(K,T,A,P) + r(FA) - T - i(B) - t(FA,B) \quad (6)$$

s.t.

$$K + FA = W + (1-\delta)B \quad (2)$$

$$T = \alpha_1 C + \alpha_2 IH + \alpha_3 D + \delta_1 IL + \delta_2 TL + \delta_3 FL \quad (3)$$

$$0 \leq (K, T, C, IH, D, IL, TL, FL)$$

$$0 \leq \alpha_i, \delta_i \leq 1$$

and given that:

$$FA = C + IH + D$$

$$(1-\delta)B = (1-\delta_1)IL + (1-\delta_2)TL + (1-\delta_3)FL$$

$$r(FA) = r_C C - r_C(\alpha_1 C/T)(\alpha_1 C/2) + r_{IH} IH - r_{IH}(\alpha_2 IH/T)(\alpha_2 IH/2) + r_D D - r_D(\alpha_3 D/T)(\alpha_3 D/2) \quad (4)$$

$$i(B) = i_{IL}(1-\delta_1)IL + i_{IL}(\delta_1 IL/T)(\delta_1 IL/2) + i_{TL}(1-\delta_2)TL + i_{TL}(\delta_2 TL/T)(\delta_2 TL/2) + i_{FL}(1-\delta_3)FL + i_{FL}(\delta_3 FL/T)(\delta_3 FL/2) \quad (5)$$

The Lagrangian for this problem is expressed as:

$$L = RE + L_1(W + (1-\delta)B - K - FA) + L_2(T - \alpha_1 C - \alpha_2 IH - \alpha_3 D - \delta_1 IL - \delta_2 TL - \delta_3 FL)$$

Differentiating with respect to the decision variables yields the first order conditions. Solving the first order condition equations for the proportions of the different sources of financing (C/T), (IH/T), (D/T), (IL/T), (TL/T) and (FL/T) for a given (T) yields the following simultaneous equations system:

$(C/T) = f(r_C, t_C, Y_K, i_{IL}, t_{IL}, (IL/T))$

$(IL/T) = f(i_{IL}, t_{IL}, Y_K, r_{IH}, t_{IH}, (IH/T))$

$(IH/T) = f(r_{IH}, t_{IH}, Y_K, i_{TL}, t_{TL}, (TL/T))$

$(TL/T) = f(i_{TL}, t_{TL}, Y_K, r_D, t_D, (D/T))$

$(D/T) = f(r_D, t_D, Y_K, i_{FL}, t_{FL}, (FL/T))$

$(FL/T) = 1/\delta_3 [1-(\alpha_1 C/T)-(\alpha_2 IH/T)-(\alpha_3 D/T)-(\delta_1 IL/T)-(\delta_2 TL/T)]$

The objective of this model is to examine the financial structure of the firm using the structural system of simultaneous equations which accounts for the endogeniety of financial contracts in different sub-sectors.

III. Data from the Enterprise Survey in The Gambia

To examine the alternative sources of financing used by manufacturing industries in various sub-sectors, a survey of 153 micro, small and medium scale enterprises was carried out in March and April, 1992, in The Gambia. The survey covered the four principal sub-sectors in the country's small manufacturing sector. These consisted of bakeries, both traditional and modern, metal workshops, tailoring workshops and tie-dye producers. Roughly 40 enterprises were surveyed in each sub-sector. These enterprises were operated primarily by owners (84 percent) with an average value of physical assets of D128,727 (US $14,464). This value, however, varies substantially by sub-sector. The average number of employees in the surveyed enterprises was five persons; however, the range of employees was from zero to 26 workers. Thus, the sample includes micro, small and a few medium scale enterprises. The average firm has been in operation for 10 years and the average business experience for an entrepreneur before starting her/his current business was five years. The survey did not exclude large enterprises, but larger enterprises do not exist in the manufacturing sector in The Gambia.

Most of the external funds used to finance current operations are obtained from informal sources. This is not surprising considering the attractiveness of t-bills for financial institutions relative to lending to enterprises. First, all entrepreneurs operating in the four sub-sectors reported that they use retained earnings as a source of financing for their current operations. Second, about 67 percent of the entrepreneurs reported that they use informal sources of finance obtained from other enterprises, or family and friends in their current operations. Third, informal financial savings were a significant source of financial services for 30 percent of the

entrepreneurs who participated in rotating savings and credit associations and for 12 percent who held deposits with moneykeepers.[4]

Fourth, 62 percent of the entrepreneurs in the total sample reported receiving customer advances to assist in financing their business operations. This source is especially significant for tailoring and metal workshops that produce custom made products for their clients. Customer advances were a source of financing for 97 percent of the metal workshops and for 92 percent of the tailoring workshops. Fifth, suppliers credit was an important source of financing used by 32 percent of the total sample. This type of finance is significant for bakeries, both modern and traditional, where 85 percent and 81 percent of the bakers, respectively, reported the frequent use of this source to purchase their inputs. Sixth, and last, only 23 percent of the entrepreneurs interviewed acquired formal finance for operating their businesses. Important sub-sector differences were found in that formal loans are significant for modern bakeries, but much less significant for the other sub-sectors.

IV. Econometric Methods and Analysis

The allocations of financial assets and liabilities used to finance the firm's operating costs for a given period are jointly determined in a structural system of simultaneous equations (eqs. 1-5). The empirical model that is derived from the general structural simultaneous equations system can be written as:

$$(\frac{C}{T})=\beta_{10}+\beta_{11}(t_C)+\beta_{12}(r_C)+\beta_{13}(i_{IL})+\beta_{14}(t_{IL})+\beta_{15}(\frac{IL}{T})+\beta_{16}(Y_K) \qquad (1)$$

$$(\frac{IL}{T})=\beta_{20}+\beta_{21}(t_{IL})+\beta_{22}(i_{IL})+\beta_{23}(r_{IH})+\beta_{24}(t_{IH})+\beta_{25}(\frac{IH}{T})+\beta_{26}(Y_K) \quad (2)$$

$$(\frac{IH}{T})=\beta_{30}+\beta_{31}(t_{IH})+\beta_{32}(r_{IH})+\beta_{33}(i_{TL})+\beta_{34}(t_{TL})+\beta_{35}(\frac{TL}{T})+\beta_{36}(Y_K) \quad (3)$$

$$(\frac{TL}{T})=\beta_{40}+\beta_{41}(t_{TL})+\beta_{42}(i_{TL})+\beta_{43}(r_D)+\beta_{44}(t_D)+\beta_{45}(\frac{D}{T})+\beta_{46}(Y_K) \quad (4)$$

$$(\frac{D}{T})=\beta_{50}+\beta_{51}(t_D)+\beta_{52}(r_D)+\beta_{53}(i_{FL})+\beta_{54}(t_{FL})+\beta_{55}(\frac{FL}{T})+\beta_{56}(Y_K) \quad (5)$$

The observed amounts of financial assets and liabilities used to finance the operating costs for a given period are jointly determined in a simultaneous structural system. The reduced form equations of this simultaneous structural system can be written as:

$$\begin{aligned}(C/T)=\alpha_{10}&+\alpha_{11}(r_C)+\alpha_{12}(t_C)+\alpha_{13}(i_{IL})+\alpha_{14}(t_{IL})+\alpha_{15}(r_{IH})+\alpha_{16}(t_{IH})+\\&\alpha_{17}(i_{TL})+\alpha_{18}(t_{TL})+\alpha_{19}(r_D)+\alpha_{1,10}(t_D)+\\&\alpha_{1,11}(t_{FL})+\alpha_{1,12}(i_{FL})+\alpha_{1,13}(Y_K)\end{aligned} \quad (6)$$

$$\begin{aligned}(IL/T)=\alpha_{20}&+\alpha_{21}(r_C)+\alpha_{22}(t_C)+\alpha_{23}(i_{IL})+\alpha_{24}(t_{IL})+\alpha_{25}(r_{IH})+\alpha_{26}(t_{IH})+\\&\alpha_{27}(i_{TL})+\alpha_{28}(t_{TL})+\alpha_{29}(r_D)+\alpha_{2,10}(t_D)+\\&\alpha_{2,11}(t_{FL})+\alpha_{2,12}(i_{FL})+\alpha_{2,13}(Y_K)\end{aligned} \quad (7)$$

$$(IH/T)=\alpha_{30}+\alpha_{31}(r_C)+\alpha_{32}(t_C)+\alpha_{33}(i_{IL})+\alpha_{34}(t_{IL})+\alpha_{35}(r_{IH})+\alpha_{36}(t_{IH})+\alpha_{37}(i_{TL})+\alpha_{38}(t_{TL})+\alpha_{39}(r_D)+\alpha_{3,10}(t_D)+\alpha_{3,11}(t_{FL})+\alpha_{3,12}(i_{FL})+\alpha_{3,13}(Y_K) \quad (8)$$

$$(TL/T)=\alpha_{40}+\alpha_{41}(r_C)+\alpha_{42}(t_C)+\alpha_{43}(i_{IL})+\alpha_{44}(t_{IL})+\alpha_{45}(r_{IH})+\alpha_{46}(t_{IH})+\alpha_{47}(i_{TL})+\alpha_{48}(t_{TL})+\alpha_{49}(r_D)+\alpha_{4,10}(t_D)+\alpha_{4,11}(t_{FL})+\alpha_{4,12}(i_{FL})+\alpha_{4,13}(Y_K) \quad (9)$$

$$(D/T)=\alpha_{50}+\alpha_{51}(r_C)+\alpha_{52}(t_C)+\alpha_{53}(i_{IL})+\alpha_{54}(t_{IL})+\alpha_{55}(r_{IH})+\alpha_{56}(t_{IH})+\alpha_{57}(i_{TL})+\alpha_{58}(t_{TL})+\alpha_{59}(r_D)+\alpha_{5,10}(t_D)+\alpha_{5,11}(t_{FL})+\alpha_{5,12}(i_{FL})+\alpha_{5,13}(Y_K) \quad (10)$$

$$(FL/T)=\alpha_{60}+\alpha_{61}(r_C)+\alpha_{62}(t_C)+\alpha_{63}(i_{IL})+\alpha_{64}(t_{IL})+\alpha_{65}(r_{IH})+\alpha_{66}(t_{IH})+\alpha_{67}(i_{TL})+\alpha_{68}(t_{TL})+\alpha_{69}(r_D)+\alpha_{6,10}(t_D)+\alpha_{6,11}(t_{FL})+\alpha_{6,12}(i_{FL})+\alpha_{6,13}(Y_K) \quad (11)$$

The array of different financing sources that an entrepreneur may use to fund total expenditures represents some zero and non-zero amounts for the variables (C/T, IL/T, IH/T, SL/T, D/T, FL/T) on the left hand side (LHS) of the equations in the model. The sequential two-stage estimation technique used in the study involves, first, estimating the reduced form equations using the standard tobit model for equations with limited LHS variables or least squares for unconstrained LHS variables, as appropriate for each reduced form equation (Table 2). Second, we obtain the predicted values of the endogenous variables from step 1, and insert the predictors for the endogenous variables on the RHS of the equations in the structural model. Third, we estimate the structural equations using the tobit maximum likelihood technique or least

squares to generate the results of the model presented in Table 3. This methodology is similar to that used in Nelson and Olson's model (1978), reviewed by Amemiya (1984) under a type 4 tobit model, which generates consistent and asymptotically normal estimates.

The first important result of the model confirms that several differences exist among sub-sectors. Entrepreneurs operating bakeries, and metal and tailoring workshops are associated with larger amounts of informal savings than entrepreneurs in tie-dye production. Entrepreneurs engaged in metal work and tailoring also utilize trade finance to a larger extent than entrepreneurs in the other sub-sectors. Moreover, the reduced form equations in Table 2 indicate that the long-term trend for entrepreneurs operating bakeries and metal workshops is to hold smaller amounts of formal deposits, while entrepreneurs operating tailoring workshops hold larger amounts of formal deposits as a proportion of total expenditures.

Second, the findings imply that a larger value of total assets are negatively associated with informal savings. However, the long-term effects, as indicated from the reduced form equations, imply that a larger value of total assets is associated with larger formal loans as a proportion of total expenditures and with smaller formal deposits. Larger total assets are typical of modern bakeries and it is expected that a positive relation would hold with formal loans. Larger amounts of informal savings, trade loans and formal deposits are associated with higher profitability. This implies that entrepreneurs engaged in more profitable activities, such as tailoring, hold larger amounts of informal and formal deposits, and acquire larger amounts of trade finance from suppliers and customers. Moreover, larger enterprises, proxied by the number of employees, are associated with smaller amounts of informal loans, but with larger amounts of trade loans and formal deposits.

Third, entrepreneurs with more years of previous experience utilize fewer formal loans than entrepreneurs with less experience. Moreover, higher levels of education and more previous experience are associated with larger formal deposits. These results could represent more risk averse behavior. Female entrepreneurs tend to hold more informal and formal savings than their male counterparts. This result may also imply that female entrepreneurs exhibit more risk averse behavior than males.

Fourth, rates of return, interest rates and transaction costs are significantly associated with their respective sources of financing indicating the importance of prices in determining the sources of finance that entrepreneurs use. Fifth, and finally, the negative relationship between trade loans and deposits supports the idea of substitution of financial sources. However, the positive relationship between deposits and formal loans supports the concept of complimentarity of these types of financial services which is consistent with asymmetric information and credit rationing theory.

The findings of the model can be summerized to indicate a set of relationships describing enterprise and entrepreneurial characteristics associated with the use of different financial assets and liabilities across different sub-sectors. Informal loans are larger for smaller enterprises, those which have been in operation for a long time and for more educated entrepreneurs. Increases in informal savings are associated with a decreased value of physical capital, increased profitability, enterprises in the bakeries, metal working and tailoring subsectors, and for female entrepreneurs. Increases in trade loans are associated with increases in profitability, increased size of the enterprise, and enterprises operating in the metal working and tailoring subsectors. Increases in deposit holdings are associated with increases in the size of the business, education,

previous experience of the entrepreneur and for female entrepreneurs. Increases in formal loans, as indicated from the long-term multiplier effects, are associated with increases in the value of physical capital, with decreases in the size of the business and with decreases in previous experience of the entrepreneur. Finally, decreases in trade loans are associated with increases in deposit holdings and increases in deposit holdings are associated with increases in formal loans.

V. Summary and Conclusions

The objective of this study was to analyze the differences found across sub-sectors in the sources of financing used by non-farm manufacturing enterprises in low income countries. The study involved an examination of the entrepreneur's choice among various sources of financing and how financial contracts influence firm behavior across sub-sectors. The research utilized sub-sector analysis to analyze how linkages among firms, especially for input purchase and output sales, simultaneously determine the financial structure of the firm.

Sub-sector analysis focuses primarily on the study of vertical linkages and contracts in the distribution or production of goods among the different economic agents. A large set of literature has utilized the sub-sector approach in empirical studies focusing on private sector development in low income countries. These studies recognize the importance of the sub-sector in explaining the prevailing market contracts and efficiencies. However, most of these studies implicitly or explicitly treat finance as an exogenous factor rather than endogenous in their analysis of a sub-sector and its performance.

The theoretical model presented in this study extends the standard sub-sector analysis by incorporating financial transactions as endogenous factors within each sub-sector. Utilizing this

modified sub-sector approach, the model addresses the sources of financing of micro, small and medium scale manufacturing enterprise in developing economies. More specifically, the model examines the financial structure of the firm by deriving a structural system of simultaneous equations which accounts for the endogeniety of financial contracts in different sub-sectors. The study presents empirical implications based on a study of four sub-sectors in The Gambia.

The characteristics of the subsector within which an entrepreneur operates can be expected to make a significant difference in the sources of finance that individual enterprises utilize. Trade credit is an important source of finance for enterprises which manufacture custom-made products, such as metal products and tailoring, while informal savings and formal deposit holdings are significant sources of finance in the traditionally female profession of tailoring. Entrepreneurs operating in the male dominated professions of bakeries and metal work, however, deposit largely with informal moneykeepers rather than with formal institutions. The subsector of operation does not seem to affect the entrepreneurs' use of formal loans directly, although entrepreneurs with larger assets, such as modern bakeries, are associated with using more formal loans.

These results are important because they show that if enterprises are profitable, have a large number of employees, have competing sources of input supplies or customer demand and are operated by entrepreneurs who had a large amount of experience in the line of business before starting their businesses, entrepreneurs would use more internal and informal sources of finance and less formal finance. The use of informal financial services, such as trade credit, is positively associated with the use of formal deposit holdings. The use of formal finance, however, remains the domain of entrepreneurs who can provide more information, such as a

higher value of working assets which is a proxy for collateral, that reduces asymmetry problems for formal institutional lenders.

Improving formal finance, which is the emphasis of most policies, would be of benefit to all creditworthy firms. But the small size and limited collateral capacity of many firms in the sample suggest that only a few firms will obtain this source of finance. Therefore, informal finance is likely to continue to be important. Trade finance is among the most significant sources of finance in the manufacturing sector. Traders sell inputs to small enterprises on credit and customers sub-contract small enterprises to deliver custom-made products. If formal intervention schemes are necessary, then providing support through economic subs-sectors may be a most efficient method to reach small enterprises.

Table 1. Definition of Variables in the Simultaneous Equations Model of the Different Sources of Financing Shares Relative to Total Expenditures

Variables	Definition
Exogenous Variables	
K	Physical assets (Dalasis);
P	Total value of output (Dalasis);
T	Total cost of inputs (Dalasis);
EMPLY	Number of employees;
YRS	Number of years the enterprise has been in operation;
BKR	Dummy variable = 1 for bakeries;
MTL	Dummy variable = 1 for metal workshops;
TLR	Dummy variable = 1 for tailoring workshops;
AGE	Age of the entrepreneur (Years);
EDUC	Educational level of the entrepreneur;
XEXP	Number of years of previous experience in line of business;
GENDER	Dummy variable = 1 for male entrepreneurs;
RC	Rate of return on cash holdings;
IIL	Interest rate on informal loans;
RIH	Rate of return on informal savings;
ITL	Interest rate on trade loans;
RD	Rate of return on deposits;
IFL	Interest rate on formal loans;
TCC	Transaction costs associated with cash holdings (Km);
TCIL	Transaction costs associated with informal loans (Km);
TCIH	Transaction costs associated with informal savings (Km);
TCTL	Transaction costs associated with trade loans (Dalasis);
TCD	Transaction costs associated with deposits (Km);
TCFL	Transaction costs associated with formal loans (Km);
Endogenous Variables	
CT	Cash holdings relative to total cost of inputs;
ILT	Informal loans relative to total cost of inputs;
IHT	Informal savings relative to total cost of inputs;
TLT	Trade loans relative to total cost of inputs;
DT	Deposits relative to total cost of inputs;
FLT	Formal loans relative to total cost of inputs.

Table 2. Reduced Form Equations of the Different Sources of Financing Relative to Total Expenditure Results (Linear-Log Functional Form)

Variables	OLS (CT)	TOBIT (ILT)	TOBIT (IHT)	TOBIT (TL/T)	TOBIT (DT)	TOBIT (FLT)
Const.	+	+	+	+	- **	- ***
LK	-	-	- **	+	- **	+ **
LPT	-	+	+ ***	+ ***	+ *	+
LEMPLY	-	- **	- *	+ *	+	- ***
LYRS	+	+ **	-	-	+	+
BKR	-	+	+ ***	-	- ***	-
MTL	+	-	+ ***	+ ***	- ***	+
TLR	+	+ *	+ **	+	+ **	+
LAGE	-	-	-	-	+	+
LEDUC	+	+	-	-	+ *	+
LXEXP	-	-	+	+	+	- ***
GENDER	-	+	- ***	+	-	+
LRC	-	+	+ *	+ *	-	- **
LIIL	-	+	-	+	+ ***	-
LRIH	+	-	+ ***	+	-	-
LITL	-	+	-	+ **	+ *	+ **
LRD	-	+	- ***	-	+ ***	-
LIFL	-	-	+	-	+	+
LTCC	-	+	- *	+ *	- ***	- **
LTCIL	-	+ **	-	-	-	+ **
LTCIH	-	+	+ ***	-	+ ***	+
LTCTL	+	+	-	-	+ ***	+
LTCD	-	+	- **	-	- ***	- *
LTCFL	+	- *	+	+	+ *	+ ***
R-SQR	0.23					
LH		140.42	-97.25	-98.33	-1.08	19.02

***, ** & * represent significance at 1, 5 and 10 percent levels, respectively.

Table 3. Second-Stage Structural Equation Estimation of the Different Sources of Financing Relative to Total Expenditure (Linear-Log Functional Form)

Variables	OLS (CT)	TOBIT (ILT)	TOBIT (IHT)	TOBIT (TL/T)	TOBIT (DT)
Const.	1.303	1.268	3.415	-0.774	-3.162
	(1.142)	(1.681)	(2.753)	(2.824)	(3.668)
LK	-0.4E-01	0.080	-0.503 ***	0.025	-0.123
	(0.5E-01)	(0.088)	(0.168)	(0.102)	(0.102)
LPT	-0.083	0.117	0.728 *	0.940 ***	0.282
	(0.158)	(0.244)	(0.465)	(0.236)	(0.276)
LEMPLY	-0.073	-0.357 *	-0.360	0.333 *	0.379 *
	(0.161)	(0.199)	(0.344)	(0.188)	(0.243)
LYRS	0.027	0.230 *	0.095	-0.029	0.060
	(0.084)	(0.122)	(0.178)	(0.117)	(0.145)
BKR	-0.324	-0.485	4.740 ***	0.180	0.256
	(0.284)	(0.485)	(0.942)	(0.483)	(0.719)
MTL	0.203	-0.313	3.919 ***	1.430 ***	0.372
	(0.239)	(0.391)	(1.088)	(0.379)	(0.514)
TLR	0.218	0.322	1.188 *	0.882 *	0.020
	(0.266)	(0.379)	(0.674)	(0.465)	(0.468)
LAGE	0.051	-0.620	-1.049	-0.145	-0.162
	(0.361)	(0.489)	(0.713)	(0.473)	(0.629)
LEDUC	0.101	0.229 **	0.039	-0.053	0.304 **
	(0.086)	(0.112)	(0.183)	(0.105)	(0.128)
LXEXP	-0.093	-0.163	0.013	0.105	0.290 *
	(0.087)	(0.130)	(0.183)	(0.129)	(0.168)
GENDER	-0.183	0.462	-1.084 **	0.443	-0.798 **
	(0.224)	(0.333)	(0.497)	(0.289)	(0.354)
LRC	-0.9E-02				
	(0.126)				
LIIL	-0.054	0.436			
	(0.227)	(0.295)			
LRIH		-0.058	0.281 ***		
		(0.061)	(0.097)		
LITL			-0.315	0.679 ***	
			(0.463)	(0.241)	
LRD				0.306	1.829 **
				(0.929)	(0.885)
LIFL					-0.662
					(0.457)
LTCC	0.038				
	(0.066)				
LTCIL	0.018	0.835 ***			
	(0.066)	(0.292)			
LTCIH		-0.5E-02	1.382 ***		
		(0.232)	(0.226)		
LTCTL			-0.186	0.4E-02	
			(0.160)	(0.069)	
LTCD				-0.115	0.323 ***
				(0.076)	(0.108)
LTCFL					-0.231 **
					(0.118)
ILHAT	-6.441				
	(10.17)				
IHHAT		0.106			
		(0.097)			
TLHAT			0.961		
			(1.038)		
DHAT				-1.162 **	
				(0.564)	
FLHAT					5.279 ***
					(1.351)
R-SQR	0.18				
LH		138.25	-109.78	-99.90	-54.75

Asymptotic standard errors are reported in parentheses.
***, ** & * represent significance at 1, 5 and 10 percent levels, respectively.

NOTES

1. Asset specificity is measured by the degree of scale and scope economies, specialization of equipment and technology required for production. Uncertainty is measured by the degree of perishability of inputs and outputs and uncertain market demand (Jaffee, 1992).

2. This framework follows Burkett-Vogel (1989); however, the model incorporates additional factors with respect to the sources of financing, i.e., several external sources of debt, and offers additional interpretations.

3. Expenditure on operating costs are assumed to occur at a constant and continuous rate during the production period.

4. Moneykeepers are private individuals who hold money for safekeeping purposes.

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